

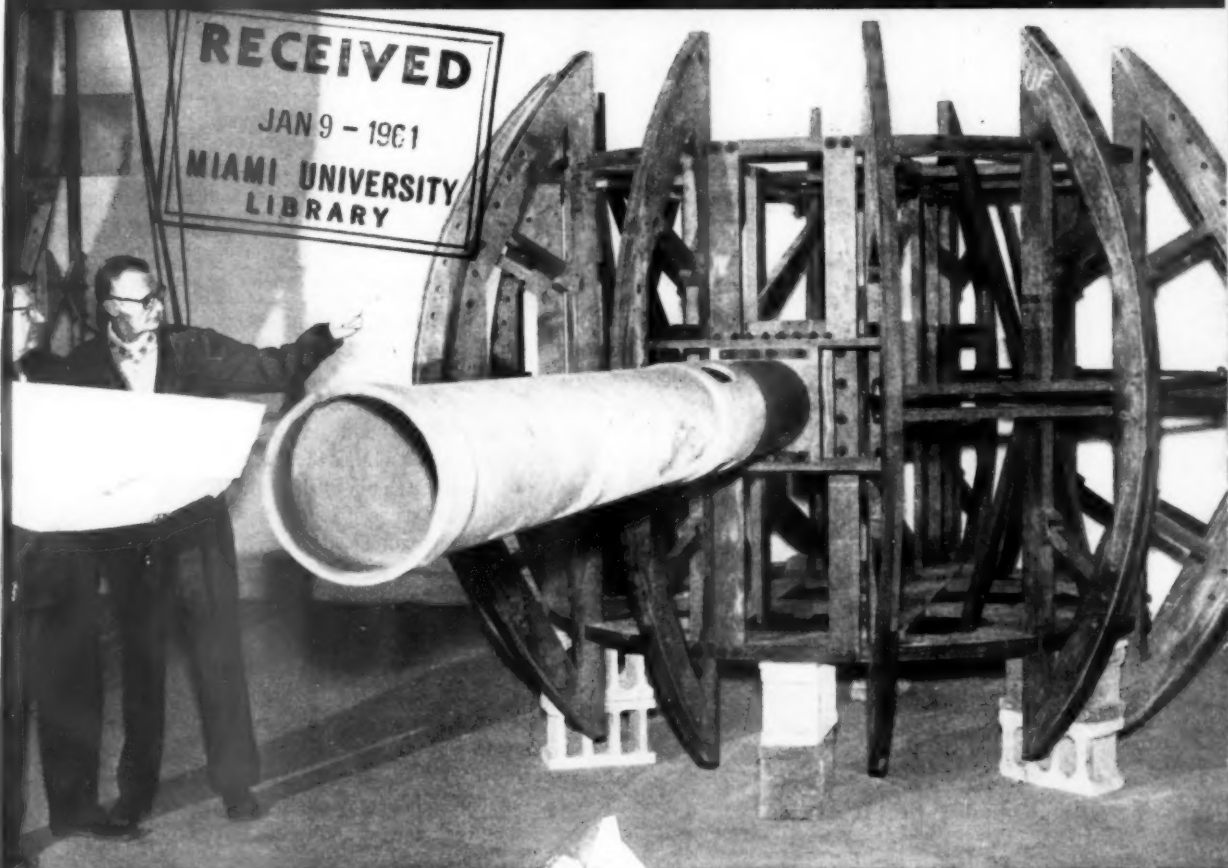
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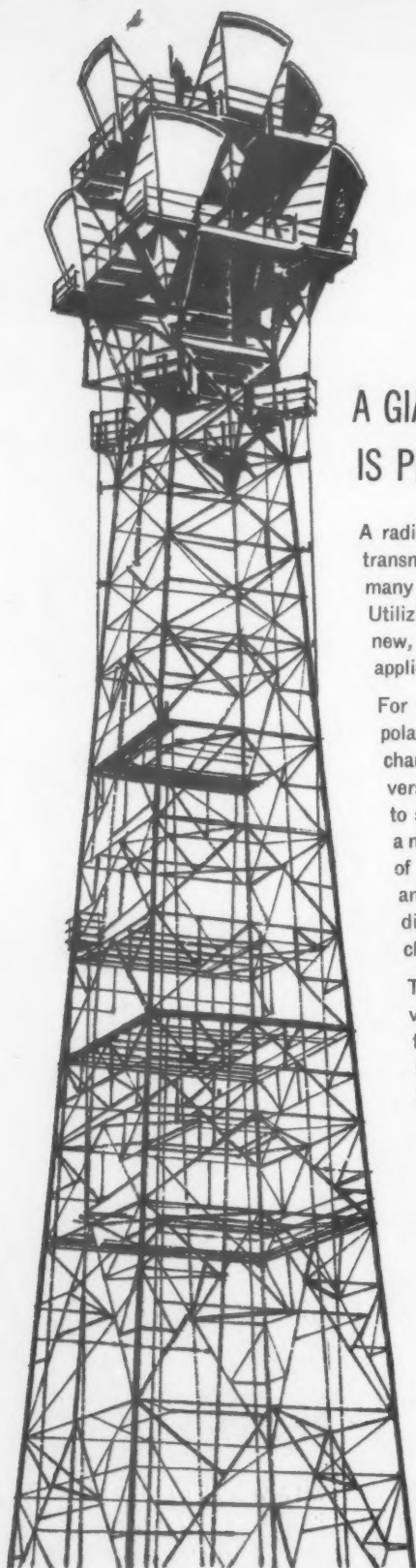
# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



A SCIENCE SERVICE PUBLICATION

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## A GIANT RADIO HIGHWAY IS PERFECTED FOR TELEPHONY

A radio relay system operating at 6 billion cycles per second and able to transmit 11,000 voices on a single beam of microwaves—several times as many as any previous system—has been developed at Bell Laboratories. Utilizing the assigned frequency band with unprecedented efficiency, this new, heavy-traffic system was made possible by the development and application of new technology by Bell Laboratories engineers and scientists.

For example, they arranged for the waves in adjacent channels to be polarized 90 degrees apart, thus cutting down interference between channels and permitting the transmission of many more telephone conversations in the same frequency space. They developed ferrite isolators to suppress interfering wave reflections in the waveguide circuits; and a new traveling wave tube that has ten times the power handling capacity of previous amplifiers and provides uniform and almost distortionless amplification of FM signals. They devised and applied a new high-speed diode switching system which instantly switches service to a protection channel when trouble threatens.

To transmit and receive the waves, the engineers applied their invention, the horn-reflector antenna. Elsewhere, this versatile antenna type is brilliantly aiding space communication research in the reception of radio signals from satellites. For radio relay, a single horn-reflector antenna can efficiently handle both polarizations of the 6000 megacycle waves of the new system; at the same time it can handle 4000 and 11,000 megacycle waves used for existing radio relay systems. Thus it enables all three systems to share economically the same radio towers and routes.

Produced by the Bell System's manufacturing unit, Western Electric, the new system is now in operation between Denver and Salt Lake City, and will gradually be extended from coast to coast. This new advance in radio technology is another example of how Bell Telephone Laboratories works to improve your Bell communication services.



**BELL TELEPHONE LABORATORIES**

World center of communications research and development

## GENERAL SCIENCE

# Report Science to Layman

The scientist has a duty to report his findings to the general public and in a manner the layman understands. Participation in public affairs by the scientist is important.

► THE SCIENTIST has a duty to report his scientific findings to the general public, and he should make reports the average layman can understand, Dr. Thomas Park, zoologist at the University of Chicago and president-elect of the American Association for the Advancement of Science, told SCIENCE SERVICE.

"We are moving faster in this area than ever before," he said, but the scientist still has not gone far enough in public communication. He credited recent advances in communication since Sputnik to the "curiosity and interest of our young people."

"This and a general rising public interest in the impact of science has stimulated scientists to respond more freely," Dr. Park said.

"One of the best ways to get scientific information to the public is through such organizations as the AAAS, Science Service and other science information media, as well as by direct contact and communication with talented science writers," he said. The AAAS is the world's largest group of scientific organizations, and includes science writing, education and information groups.

"The scientist also has a responsibility to speak as a citizen," Dr. Park said. "But when he speaks as an intelligent and sensitive citizen on community matters, he should not presume to speak with scientific authority except on matters within his competence."

"Anything I would say on the national and local implications of nuclear development, for example, would have no scientific validity. This is not my scientific field and I can speak only as an informed and concerned citizen rather than as a scientist," he emphasized.

However, participation in public affairs by the scientist is important. It helps break the barrier that traditionally has set the scientist apart from the community, Dr. Park said.

An important area of community interest in which Dr. Park can speak with scientific authority concerns population growth and development, and the forces affecting them.

Dr. Park has done research on the basic scientific problems of population since 1927. Using insects such as the flour beetle, he has investigated such subjects as birth rates, death rates, population crowding, and competition and its effect on population numbers.

"We have proved many times over, working with experimental insect population, that when population becomes too crowded, bad things happen. The death rate increases while the birth rate decreases. There is an increase in disease and malformations and a general physiological deterioration or weakening."

"These things occur even though food

supplies are ample. We know, of course, that overcrowding on the human level also has ill results; but generally speaking, it would not be entirely correct to say that what has been learned from insect population studies applies directly to the human population," Dr. Park said.

Dr. Park participated in the General Symposium of the 127th annual AAAS meeting in New York.

• Science News Letter, 79:3 January 7, 1961

## Men Will Serve Machines

► FUTURE SPACEMEN will play "second fiddle" to instruments launched from earth by man to perform vital space functions, Dr. S. F. Singer, University of Maryland physicist, predicted.

"Sooner or later the instrumentation systems, built up to perform vital space functions, will become so complicated and expensive that we will need man in the very inglorious role of a maintenance and repair man, for complex television and communication satellites, or to the complex astronomical observatories in space," he told the American Association for the Advancement of Science meeting in New York.

Dr. Singer described man as "the only non-linear, 150-pound servomechanical sys-

tem which can be mass-produced by unskilled labor."

Although man may have to serve machines in space, he will also be serving himself. Studying the biological system that is man in the absence of earth "will be useful to us because we are men and can absorb the information and apply it for our benefit," Dr. Singer said.

Man in space will assume his most important role in the military field because he is an ideal mechanism for providing the judgment, selection and filtering necessary to make a reconnaissance system operate most efficiently.

• Science News Letter, 79:3 January 7, 1961

## Minerals Found in China

► RECENT VALUABLE MINERAL discoveries in Red China are due to the vast increase in the number of her trained scientists since the Communist regime came to power, Dr. Edward C. T. Chao of the U. S. Geological Survey in Washington, D. C., reported.

Prior to 1950, before the Communists assumed control over China, only about 200 scientists were actively engaged in geological research. Now Red China boasts over 21,000 "geological workers," he reported at the 127th annual meeting of the American Association for the Advancement of Science in New York.

Among the many new and large mineral deposits discovered by this corps of Chinese geological workers is the molybdenum reserve, now rated "number one in the world."

Molybdenum is one of the important hard, light, temperature-resistant metals par-



**CONTENTED COW**—The newest idea for getting more and better milk is foam mattresses for cows. More sanitary than straw, the nylon covered mattress can be kept clean when hosed with water while the cow goes off for milking. During tests of the "Kowlays" milk yields were increased and bruising of hocks and mastitis were almost eliminated.

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ticularly useful in the construction of airplanes and space vehicles.

"The Chinese geologists also have discovered very large iron and copper deposits that from reports would appear to compare with any of the world's first rate deposits of these valuable metals, Dr. Chao said. New deposits of boron, potash and chromium also have resulted from surveys made by the "geological workers," as well as important sources of radioactive minerals.

The production of tungsten, tin and antimony, for which China has been world famous for nearly half a century, also has shown a marked increase under the Chinese Communists. In recent years, Communist China had been the foremost world producer of tungsten and antimony, world-significant export metals; and she is now the second ranking producer of tin.

This progress, Dr. Chao pointed out, is being made by a country whose geologic research is still virtually in its infancy.

He underscored the strong Russian influence that "permeates some areas of thinking in Chinese geology." Many field and laboratory procedures are patterned after the Russians, Dr. Chao said. More than 400 Russian geologists and engineers have visited China and participated in field geologic work or training program in China, in the past ten years.

• Science News Letter, 79:3 January 7, 1961

## Poor Man's Space Probe

► METEORS, which become "shooting stars" when burning up in the earth's atmosphere, are the "poor man's space probe," Dr. Edward Anders of the University of Chicago told the American Association for the Advancement of Science meeting in New York.

Dr. Anders was named winner of a top award, the Newcomb Cleveland \$1,000 Prize, for his new theory on the life and death of meteorites.

From the viewpoint of learning about the nature of cosmic radiation, Dr. Anders said that a "meteorite is nothing but a 'poor man's space probe' that was launched quite unceremoniously somewhere in the asteroidal belt sometime during the last two billion years and was recovered recently without assistance from the Air Force."

He believes that asteroidal-size bodies were formed from primordial cosmic dust. These bodies underwent volcanic-like eruptions, cooled to sub-zero temperatures, collided with each other in space and broke up into meteorites.

The maximum size of these asteroids, parent bodies of meteorites, was not more than 300 miles in diameter. The asteroidal belt, birthplace of meteorites, is located between the orbits of Mars and Jupiter.

The parent bodies were formed early in the history of the solar system, four and a half to five billion years ago, Dr. Anders reported.

Meteorites, Dr. Anders said, offer clues to such fundamental questions as the origin and age of the chemical elements, the origin of life, the age of the earth, the relation between cosmic rays and the sun, and even such down-to-earth ones as "the wearing

away of missile nose cones during passage through the atmosphere."

At the present rate of progress in the study of meteorites, which has greatly increased recently, he predicted that in another two years or so scientists would have "acquired a thorough understanding of the nuclear events that preceded the formation of the solar system."

• Science News Letter, 79:4 January 7, 1961

## Gangs Poorly Organized

► VIOLENT JUVENILE gangs are not the close-knit organizations they are generally assumed to be.

This basic misconception produces inaccurate reports and causes ineffectual remedial action work with gangs, Dr. Lewis Yablonsky, University of Michigan sociologist and a visiting lecturer at Harvard University, reported.

These gangs are better characterized as "near-groups." They have disturbed leadership, shifting membership, limited definition of membership requirements, impermanence and a minimal consensus of norms, he reported to the American Association for the Advancement of Science meeting in New York.

In treating the gang, the removal of the leader and his commitment for psychiatric observation is essential.

A community should not take the position that gang activity, which often results in violence or senseless killings, is rational, normal behavior," Dr. Yablonsky said.

"With gang behavior stigmatized as 'crazy or nutty' many youths would not participate in the gang and its violence," Dr. Yablonsky said. There is glory in being known as tough but none in being known as sick by gang youths, he noted.

The gang followers are not as disturbed as the leaders. They can be reasoned with and led into constructive activities.

He urged local citizens to work with youths in various constructive community activity projects. This would minimize a basic current cause of delinquency—the breakdown of adult-youth relationship, Dr. Yablonsky said.

He initiated such a project, the Adult-Youth Association in a high-delinquency area in New York. The program has involved more than 600 youngsters in productive interaction working with about 40 cooperative local adults. It has helped reduce delinquency, gang violence and youth problems in the area.

Delinquency also could be decreased by improvements in the more traditional correctional services of probation, parole and institutional facilities.

• Science News Letter, 79:4 January 7, 1961

### GENERAL SCIENCE

## Raw Materials Shortage In U. S. and Canada

► BY 1980 the United States and Canada will need twice as much industrial raw material as they now use. Because of this high rate of consumption, these countries can no longer be classified as surplus ma-

terials areas, stated Wilbert G. Fritz of the U. S. Office of Civil and Defense Mobilization in a special report prepared for the Canadian-American Committee.

During the next 20 years, the United States and Canada will become more dependent upon each other for sources of industrial raw materials. The United States will import more iron ore, natural gas and nickel from Canada, and Canada will depend upon the United States for more coal, molybdenum and phosphate.

In addition to the transfer of raw materials across the border, both countries will also rely more heavily on overseas sources of supply.

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## AGRICULTURE

# Agriculture Advances

► THE U. S. DEPARTMENT of Agriculture, Washington, D. C., reviewed its research findings and advances, including some 20 advances made during 1960.

Among the basic research finds:

The sex attractant produced by the female gypsy moth was synthesized and can now be manufactured in unlimited quantities for detecting infestations and may be used in moth control programs.

A chemical that causes sterility of both male and female houseflies and fruit flies when placed in their food was given its first field trials. The result is self-annihilation of the flies.

A newly discovered species of water mold fungus, common to Louisiana sugarcane soil and believed to be widely distributed in nature, was tested for biological control of nematodes (small, round worms). In the laboratory, this fungus, which kills by penetrating the skin and growing inside the nematode, was successful in killing eight kinds of harmful nematodes.

A poultry cancer, Rous sarcoma, previously thought to be non-contagious was proved transmissible by direct contact between birds. These studies support the belief of many scientists that viruses cause some forms of cancer.

Other USDA scientists bred chickens resistant to an infectious leukemia-like cancer of the bone marrow and blood, thus showing that animals can be bred for resistance to at least one type of cancer and that both sexes can transmit resistance to their offspring.

The ribonucleic-acid core of foot-and-mouth virus, the part that produces the disease, was found to resist destruction by heat more vigorously than was previously believed.

Among the crop and livestock management advances achieved by USDA scientists at more than 330 Federal and cooperating state stations:

A new method was developed for drying grains by solar-heated systems in which the blower fans require 50% less electricity than those in the conventional system.

Completely automatic handling of poultry feed from storage bins to feeders was perfected. This system uses electrically operated units that automatically blend, grind, convey and distribute feed, thus maintaining a constant supply to the poultry houses.

Hard-to-handle, volatile, weed-killing chemicals were shown to be more effective (90%) when applied in a thin band under the surface of cottonseed beds before planting. The older method of application, spraying the chemical on the soil surface and mixing with a rotary hoe, is only 75% effective.

Dairy cattle studies showed that the dairy-cow "type," the one that wins blue ribbons in the show ring, is only slightly correlated with high milk production. USDA scientists believe this finding warrants greater emphasis on dairy management and less on a show animal.

Pigs were found to produce a higher percentage of lean cuts when fed the whole ground-up corn ear, including the cob.

Twenty-one new crop varieties, incorporating better flavor, more disease and insect resistance, and higher yields were released by USDA in 1960. In the improved list were pears, citrus fruits, peabeans, lettuce, onions, cabbage, wildrye, durum wheat and hard red winter wheat.

New instruments developed include a device that determines the changing shape of the water surface and bottom of sandbed streams and another that measures minute differences in relative soil humidity.

In the future, USDA predicts, family farms will increase in size and will adopt more labor-saving improvements. The number of farms will decrease and by 1975, family farms will be even more specialized than at present, but they will continue to dominate most types of farming.

• Science News Letter, 79:5 January 7, 1961

## ORNITHOLOGY

## Kookaburra Has New Foe

► NEW SETTLERS in Australia are shooting the friendly kookaburra bird, or laughing jackass, despite strict conservation laws.

Kookaburras frequent open forest country, especially in the sandstone areas of the Blue Mountains. They are very social in their habits and often get together in groups of up to a dozen. Whole families are often seen.

The kookaburra's extraordinary laughing notes, perhaps the most familiar sound in the Australian bush, may be heard at all times of the day, but especially in the early morning and at twilight.

This bird, native to eastern Australia, has been introduced and established in Western Australia and Tasmania. Though of the kingfisher family, the kookaburra does not feed on fish, but lives on snakes, insects and carrion.

The kookaburras are almost perfectly

## ORNITHOLOGY

## Flightless Goose Found

► ISLANDS OFF the southern California coast were once the nesting grounds of a flightless goose whose wings were "clipped" by nature.

When the island sanctuary submerged temporarily, the goose sank into oblivion. Dr. Loye Miller, biologist-paleontologist at the University of California at Los Angeles, found from studies of fossil remains of the glacial age goose known as *Chendytes*. The remains were found on San Nicolas Island.

The ancient bird, which was about the size of the modern snow goose, probably evolved into a flightless form because its island nesting place was free of predators.



**THREATENED KOOKABURRA—**  
*is a friendly bird*

camouflaged into the gray-green background of the bush trees. They wait unseen for hours on tree limbs for their prey. Then they dive down on snakes, grab them by the neck in their strong beaks, fly away and drop them from a great height or break their necks against gum-tree trunks.

Kookaburras are easily made into pets by families living in the bush. They often make their nests in termites' nests high in the trees, although they sometimes use a hole in a tree.

In order to dig a hole in the very hard substance of the termites' nest, the birds fly straight at it from the nearest convenient branch, driving their stout wedge-shaped bills into the selected spot. They sometimes keep this up for several days until the hole is large enough to hold four or five white eggs.

• Science News Letter, 79:5 January 7, 1961

The genetic drift toward a tiny, virtually useless wing was not a significant handicap because the bird was not forced to use flight to escape its enemies. It swam far and wide, diving for its food, and walked from the shore to its nest.

However, its island sanctuary was its undoing. The offshore islands apparently submerged in the unstable geological processes characteristic of this area in recent geological times. With this loss of sanctuary, the bird became extinct. When the islands rose again, only a few scattered fossilized remnants were left.

• Science News Letter, 79:5 January 7, 1961

## MEDICINE

# Less Tan With Skin Cancer

► SKIN CANCER patients do not tan as well as persons without skin cancer, Drs. Mark Allen Everett and James A. Hagans, with Robert Bell, all of the University of Oklahoma Medical Center, Oklahoma City, have found.

Skin cancer patients have a "significantly reduced ability to produce pigment in response to ultraviolet exposure," their study showed.

Thirteen pairs of fair-skinned white men, aged 52 to 72, with and without skin cancer were selected from a group of patients at the University of Oklahoma Medical Center. A uniform measured quantity of ultraviolet light was given an area of previously unexposed skin of each patient (45 seconds at 20 inches from a hot quartz mercury vapor lamp).

An initial measurement with the photoelectric reflection meter was taken, and seven days later the measurement was taken with the photoelectric reflection meter equipped with a red filter. The red filter was selected as that most accurate in measuring color due to melanin, or dark pigment.

Measurements were taken of three areas on each patient: the ultraviolet exposed site, an unexposed site and the lateral neck above the collar line, which approximates the greatest exposure to sunlight in men.

The scientists report their findings of decreased pigment in exposed skin and reduced ability of the unexposed skin to tan reflect some "more profound physiochemical alteration" than can be attributed to basic skin type.

They add it may be possible to separate cancer-prone persons from others in studying the response of the unexposed skin to ultraviolet light. Further research to determine if the basic differences in the two groups existed before the development of cancer should be conducted, they suggest in the American Medical Association's Archives of Dermatology, 82:908, 1960.

Previous evidence that ultraviolet rays in sunlight are the chief cancer-causing factor in skin cancer and aging of the skin is supported by a report (p. 865) by Dr. J. B. Howell of Dallas. He cites studies showing that Texans have the highest incidence of skin cancer of any state population.

• Science News Letter, 79:6 January 7, 1961

## PUBLIC HEALTH

# Hide Signs of Drinking

► EARLY OR MIDDLE-STAGE alcoholism is usually masked by problem drinkers who put forth extra efforts to keep up work performance on their bad days, a study of more than 400 male alcoholics showed.

Supervisors have difficulty recognizing signs that are evident off the job, and tend to see the developing alcoholic as a "good worker who drinks too much now and then."

To aid in early identification of problem drinkers, Dr. Milton A. Maxwell, Alcoholism Foundation of Alberta, Edmonton, Alberta, Canada, compiled a list of 44 signs of drinking on the job. He then sent a four-page questionnaire covering the frequency of the 44 signs to more than 400 male alcoholics, mostly in New England and New York. Dr. Maxwell was formerly a senior research fellow at the Center of Alcoholic Studies, Yale University.

Fifty percent of the men had been able to keep any sign of their problem from showing up on the job for a year or more, 30% for three years or more and the rest for five or more years.

Of the 44 drinking signs on the job, hangovers were first, with 84% admitting serious or moderate degrees and 12% admitting mild or rare degrees of occurrence. Only four percent of the 400 who responded to this question said they never had hangovers on the job.

Other signs common to more than 50% included nervousness, irritability, putting

things off, red or bleary eyes, more spasmodic work pace, sensitive to opinions about his drinking, hand tremors, avoiding boss or associates, drinking at lunch time, morning drinking before going to work, flushed face, lower quantity and quality of work, using "breath purifiers," making mistakes or errors of judgment, mood change after lunch or other drinking, and more unusual excuses for absences.

Absenteeism of over a half or a whole day was 24th on the list, with only 52% of the 392 who responded to this question admitting serious or moderate occurrence. Twenty-two percent said absenteeism was rare, and 13% said they never were absent from work. Dr. Maxwell's study is reported in the Quarterly Journal of Studies on Alcohol, 21:655, 1960.

• Science News Letter, 79:6 January 7, 1961

## GENERAL SCIENCE

# Subscribers Invited to Send Old Copies to Asia

► COPIES OF SCIENCE NEWS LETTER when ready to be discarded are being sent by some subscribers to Asia addresses that may be secured by writing to Magazines, Box 3196, Los Angeles 28, Calif.

Mr. and Mrs. Henry Mayers began, as the result of a trip to Asia, this effort to aid Americans share their magazines with Asians who request such cooperation

through U. S. Information Service and other Government channels. More requests come for science than for sport magazines. Copies of SNL can be sent to Asia for less than 10 cents sea post.

• Science News Letter, 79:6 January 7, 1961

## INVENTION

# Radar Traffic Control and Fuel Device Patented

► THE TYPICAL American scene of an irritated auto driver, waiting impatiently for the red light at an intersection to change although no others cars are in sight, may soon disappear.

A new radar detecting device should solve this and many other problems found at traffic intersections. The device for controlling traffic, which received patent No. 2,965,893, in Washington, D. C., sends out very high frequency radio waves that bounce off cars approaching an intersection. The number of pulses sent back to the radar detecting device indicates the number of passing cars. John L. Barker of Norwalk, Conn., who assigned the patent rights to Eastern Industries, Inc., said that the device can be adjusted to handle the different flow of traffic throughout the day.

For those millions of Americans who have trouble starting and warming up their car engines on cold winter mornings Donald A. Munyan of Royal Oak, Mich., has developed a fuel device that regulates the amount of gasoline fed to the engine when it is first started. This invention was awarded patent No. 2,965,091 by the U. S. Patent Office.

The quantity of fuel metered out by this system depends upon the temperature of the engine. After the engine is turned over on a cold morning, movable cams in Mr. Munyan's invention change position, supplying varying amounts of gas to the engine as it warms up. The patent was assigned to Holley Carburetor Co.

A compact, portable, remote X-ray camera that can be used safely in industry has won patent No. 2,965,761 for Lorand Meray Horvath, Oakville, Ontario, Canada, who assigned the rights to Canadian Curtis-Wright, Limited. The camera, which uses a powerful source of radiation, is triggered by remote control, and is not limited to experimental or laboratory investigations.

Fishermen who enjoy fishing at night can now do so without leaving their warm campfire or cabin on a cold night. Frank Berghoff and Elmer H. Ricks, both of Lafayette, Ind., have invented a signal device that lights up a bulb when a fish strikes, warning the fisherman some distance away. The device, patent No. 2,964,869, can be attached to the fishing rod.

A selective bird feeder, patent No. 2,965,070, that feeds such friendly birds as sparrows and wrens yet keeps such birds as the crow from the food has been invented by George Myrick of Baltimore, Md.

The feeder has a perch, balanced by counterweights, that permits only lightweight birds to feed. A crow alighting on one of these platforms moves the perch downward, closing the entrance to the food.

• Science News Letter, 79:6 January 7, 1961

## ROCKETS AND MISSILES

# Sun Affects Echo Orbit

► THE EFFECT OF a severe solar storm on the orbit of ECHO I, the 100-foot balloon satellite, may have provided an important clue to the influence of solar weather on earth, scientists of the National Aeronautics and Space Administration reported in Washington, D. C.

On Nov. 12, at approximately the time a great solar storm occurred, the atmospheric drag acting on the satellite spurted upward by a factor of two, and stayed at this high value for several days before returning to its previous level.

Response of a satellite to a specific solar flare has been detected only once before, in the case of Sputnik III.

The calculations revealing the effect of the November solar storm on the balloon satellite were made by Dr. Robert Jastrow, chief of the theoretical division of NASA's Space Flight Center, and Robert Bryant, also of the division.

The increase of the drag indicated an increase in the average density of the air through which the satellite moved, Dr. Jastrow explained, and resulted when particles and radiation from the solar flares struck the atmosphere and heated it.

"Scientists have discovered that the whole upper atmosphere rises and falls, or breathes, according to the level of storminess of solar weather," he said. "There is a slight upward expansion of the atmosphere at lower levels during stormy solar weather; but the density of the very thin air at the 900-mile altitude at which ECHO I travels is greatly increased."

"One of the most interesting problems of space science and perhaps the most important is the question of solar activity and the way in which particles and radiation travel through the solar system and affect

life on earth," Dr. Jastrow said. "Storms on the sun produce great eruptions, known as flares, that spray X-rays, ultraviolet radiation and charged particles through the solar system. These have a number of serious effects on earth."

The increase in the number of charged particles in the atmosphere weakens and distorts the transmission of radio waves through the ionosphere and generally plays havoc with international radio communications, Dr. Jastrow said.

The solar storm of Nov. 12 was the most severe since the great flare of Feb. 23, 1956. It consisted of giant flares on the surface of the sun and several smaller eruptions, all within a short period.

The role played by solar flares in emptying and filling the Van Allen belts currently constitutes one of the major and most important research goals of the NASA space science program.

Both Sputnik III and ECHO I pass through the outer Van Allen belt, Dr. Jastrow said. Vanguard I does not go through the outer belt and solar flares have not detectably affected the orbit of Vanguard I. Explorer VI and VII measurements have shown that the outer Van Allen belt radiation intensity increases by as much as a thousand-fold after a solar flare.

"This may explain why the solar storms have influenced the drag on Sputnik III and ECHO I, but not on Vanguard I," Dr. Jastrow said.

The Pioneer V space probe, the recent Explorer satellites, and several NASA launchings, including a lunar orbit planned for the near future, are directed wholly or in part to the investigation of solar weather and earth relationships.

• Science News Letter, 79:7 January 7, 1961

## TECHNOLOGY

## Non-Metallic Structure For Largest Transmitter

### See Front Cover

► LARGE NON-METALLIC structures are being built for the world's most powerful very low frequency, or VLF, radio transmitter. This installation will transmit radio messages to submerged submarines patrolling the North Atlantic and Arctic Oceans.

A non-metallic rotor structure for a variometer for the U.S. Navy's radio transmitter at Cutler, Me., is seen on the cover of this week's SCIENCE NEWS LETTER. E. T. Rogers and Paul A. Doorley, vice presidents of Permal, Inc., Mt. Pleasant, Pa., check a structure built there.

The structures are built from Permal, a laminated fabric made from thin wood veneers, impregnated under vacuum with a synthetic resin and densified by heat and pressure. The mechanical properties of the material can be adjusted to order, and the proper grade for each part chosen to give maximum strength in the direction needed. The structure is assembled with nuts, bolts and dowels made from the same material.

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## ROCKETS AND MISSILES

## Air Force Engineers Design Rocket Skirts

► THE LATEST FASHION for rockets are light, tight, well-fitting "skirts" now being tested for wear and utility at the Arnold Engineering Development Center of the Air Force Research and Development Command, Tullahoma, Tenn.

The skirts are extensions flaring from the rocket bottom or nozzle. Rockets with the proper skirts can be sure of traveling high in the best space circles.

The skirt fashion that has been the favorite with the Center's rocket experts is designed for action. Ideally this is the skirt that will extend just far enough from the rocket nozzle to provide the best thrust at the planned altitude level. For efficiency, it must be light in weight.

Materials favored are glass fiber and titanium, both light in weight and heat resistant.

At Arnold Center, scale models of the skirted rockets can be tested under conditions of thrust in excess of 35,000 pounds, at altitudes above 150,000 feet, and at heat levels ranging from 100 degrees to 6,500 degrees Fahrenheit.

Gen. James Ferguson, vice-commander Air Research and Development Command, who accompanied the press on a tour of the Center, said that tests have shown that the size of the skirt expands with the stage of the rocket.

"The third stage rockets need larger skirts to provide the greater thrust to get them higher in space," he said.

The Center has made more than 1,000 simulated rocket firings for test purposes to date, aimed at getting the best rocket design for the United States.

• Science News Letter, 79:7 January 7, 1961



ROCKET SKIRT FASHIONS—designed by ARO, Inc., are being tested in the wind tunnels at the U.S. Air Force Arnold Center.

## TECHNOLOGY

**Vehicles Guided Without Human Hands Foreseen**

► A WORLD in which all kinds of vehicles could be guided without human intervention may be possible in the next 20 years.

To prepare for peaceful space activities before manned space travel is achieved, the Brookings Institution has issued a 190-page report proposing a wide range of studies, from satellite-based communications systems to those that will affect basic moral and ethical questions.

New plastics, alloys and combinations of metals and plastics may compete strongly with conventional metals and other materials because of their strength, lightness and temperature resistance, the report said. However, the demand for conventional ores may not be reduced, so a study is necessary to discover means of coping with changing patterns of the international metal trade.

The discovery of intelligent life in other parts of the universe, while not likely in the immediate future, could happen at any time. Its consequences for earth attitudes and values may be "profound." The report advises research "to determine what factors historically have entered into support or rejection of new ideas and technologies."

The space summary was prepared for the committee on long-range studies of the National Aeronautics and Space Administration, of which Hon. John A. Johnson is chairman. The Brookings report, called "Proposed Studies on the Implications of Peaceful Space Activities For Human Affairs," was done under a \$96,000 NASA grant, and required a year's work.

• Science News Letter, 79:8 January 7, 1961

## GENERAL SCIENCE

**Japanese Science Club To Start Firefly Farm**

► A FIREFLY breeding farm is the next project of a Japanese high school science club which already has successfully raised 100,000 fireflies.

This unique program of artificial hatching and culture of fireflies has grown out of a full-scale research project carried on by the Biology Club of Togane Commercial High School, Chiba Prefecture.

Each year thousands of fireflies are collected and sold in gauze-covered cages for use as garden lanterns. The firefly is also important agriculturally since the larvae devour field and garden pests.

So, as the first step in its investigation, the club collected data on the firefly population and the reasons for its depletion by sending questionnaires to 2,600 students in other high schools.

In the course of its study, the group learned that fireflies generate light even in the larval stage, that there are observable differences in the light emitted by male and female fireflies, and that intermittent light from a flashlight attracts a congregation of the insects.

The young scientists' discovery that fire-

flies would nest in an inverted flowerpot, and that pond snails and mollusks made a very suitable diet, resulted in the extensive breeding program.

The biology club was given the Prime Minister's Award when the project was exhibited at the Fourth Japan Student Science Awards program held recently in Tokyo.

Other science club projects that won top awards include research on the sea turtle, a project conducted for ten years by succeeding classes of Hiwasa Junior High School; a study of topographical features affecting weather; the development of quantitative test apparatus for proving conservation of mechanical energy, and lacunological studies of a pond in a sand dune.

Two outstanding students who carried out individual projects will be chosen as finalists to the National Science Fair-International which will be conducted by SCIENCE SERVICE in Kansas City, Mo., May 10-13, 1961.

• Science News Letter, 79:8 January 7, 1961

## PHYSIOLOGY

**Substance From Nerves May Help Bees Digest**

► ACETYLCHOLINE, the substance released from nerves to activate the muscles, may help bees digest their food.

This suggestion was made by Dr. E. H. Colhoun of the Pesticide Research Institute, London, Ontario, Canada, and Dr. M. V. Smith of Ontario Agriculture College's department of apiculture, Guelph, Ontario.

Royal jelly and honey, the natural foods of bees, contain acetylcholine, which is known to increase intestinal movement. The chemical may have an action similar to that of muscarine, a poison from mushrooms which increases salivary and intestinal secretions.

Acetylcholine seems to have no effect on the bees when it is injected in abnormally high amounts, but when they eat it, apparently something happens to their digestive tracts.

Just how the substance gets into food is still a puzzle.

Royal jelly, a food reserved for queen bees, is produced in the hypopharyngeal glands of nurse worker bees. But, the researchers reported in *Nature*, 188: 854, 1960, there is no evidence that acetylcholine is synthesized in the same place.

• Science News Letter, 79:8 January 7, 1961

## MEDICINE

**Physicians Recommend Annual Check-Up**

► A STUDY based on 587 interviews with physicians shows that three in every four agree that all adults, no matter how well they feel, should have an annual check-up, and that all women should have a pelvic examination each year.

Two out of three doctors agree that cigarette smoking is a major cause of lung cancer, the American Cancer Society meeting was told in New York. The survey of doctors' opinion was made by the University of Chicago's National Opinion Research Center.

• Science News Letter, 79:8 January 7, 1961

**IN SCIENCE**

## MEDICINE

**\$250,000 Grant Made By Cancer Foundation**

► A \$250,000 GRANT from the Eleanor Roosevelt Cancer Foundation for an international fellowship program will be supervised by the International Union Against Cancer, Dr. Harold F. Dorn, secretary-general of the IUAC, reported in Washington, D. C.

Dr. Dorn said that final plans would be agreed upon after an international committee meets in early February in London. However, it will probably be close to March 1 before announcements are sent to the 51 member nations of the IUAC, he said. The research program should be underway by next June.

Applications from qualified science students in this country who wish to do cancer research in other countries will be received along with applications from promising cancer researchers who may benefit from study in the United States.

This is believed to be the first time a voluntary organization has made a grant to an international professional organization.

• Science News Letter, 79:8 January 7, 1961

## SURGERY

**Artificial Kidney Makes Heart Operation Possible**

► THE ARTIFICIAL KIDNEY now offers hope to heart patients with excess body fluids that prevent surgery.

A 45-year-old woman's life is reported saved by an artificial kidney after every known treatment failed to remove the accumulation of blood and fluids that made an operation impossible. She had congestive heart failure, a disorder marked by a drop-sical condition.

Unless nature or medications can remove the accumulated fluids, the patient usually dies before an operation is possible.

Drs. William M. Lemmon, Teruo Hirose, Robert A. O'Connor and Charles P. Bailey of the New York Medical College, Flower and Fifth Avenue, Metropolitan Hospital Center, report successful use of the mechanical kidney after the patient failed to respond to diuretics and other treatment in the *Journal of the American Medical Association*, 174:2124, 1960.

The doctors report the artificial kidney seemed capable of accomplishing three different objectives—the elimination of excess body fluid, the restoration of the electrolyte balance of the circulating plasma, and the elimination of waste products or poisons from the blood stream.

The mechanical kidney was used twice before it was possible to operate on the woman, who recovered completely.

• Science News Letter, 79:8 January 7, 1961

# THE FIELDS

## SURGERY

### Many Blood Transfusions Unnecessary or Harmful

► THERE WOULD BE more blood available for essential transfusions if surgeons did not order them so routinely. Many transfusions are unnecessary or even harmful.

Dr. John H. Morton of the University of Rochester School of Medicine and Dentistry, Rochester, N.Y., after studying blood-transfusion practices at the University Medical Center, found a possible 72% of 169 patients received unnecessary transfusions.

Reports from other clinics indicate that the administration of single-unit transfusions is a common practice, Dr. Morton said.

Surgery in itself is not a reason to give a blood transfusion. Dr. Morton said other investigators had pointed out that promotion of wound healing, to supply proteins or calories or to correct a low hemoglobin level does not warrant administration of whole blood.

In the cases studied, the surgeon said one elderly woman received a unit of blood in the hope that she would be less disoriented and uncooperative after her operation.

"Both the patient and the community as a whole have a stake in the curtailing of unnecessary transfusions," Dr. Morton said. With open-heart surgery and other major operations increasing the demand for blood, transfusions that are not essential must be abandoned, he reported in the *New England Journal of Medicine*, 263:1285, 1960.

Dr. Morton said that the direct hazard of transfusion is small and that blood should not be withheld when the indication for its use is clear cut. Over-transfusion, with serious circulatory overloading, is one hazard to the patient receiving large amounts of blood.

• Science News Letter, 79:9 January 7, 1961

## PUBLIC SAFETY

### Banks Alerted to Danger Of Radium Storage

► METROPOLITAN BANKS have been alerted to the danger of radiation from radium that might be stored in safety deposit boxes.

The warning is sounded by Dr. D. R. Peterson, director of the adult health division, Seattle-King County, Wash., Department of Public Health, after a Seattle bank scare.

Dr. Peterson reports in *Public Health Reports*, 75:1190, 1960, that radium was removed from a Seattle bank after being stored with other valuables in a safety deposit box since approximately 1945.

The radium had been obtained in an estate, and the owners, knowing nothing better to do with it, had put it in the bank

vault. It was removed to a hospital radiation safe until further disposal after the hospital radiologist had received phone calls regarding it.

The Seattle Department of Health instituted a Geiger counter survey of 68 bank vaults in the city. Each bank paid a nominal fee for the inspection service. Only three out of 71 banks refused the service.

The average background radiation in the surveyed vaults ranged between 0.005 and 0.01 milliroentgens per hour, which is considered within normal limits. No additional radium or other radioactive material was found.

Dr. Peterson reports that the type of radium used by physicians of an earlier era, which was most likely to be uncovered, was packaged in such a way that the passing of time could permit the escape of highly toxic radon gas generated by the decay of radium. However, persons exposed to this radiological health hazard are probably few.

The probability of finding radium in bank vaults is unquestionably higher in some of the older and larger metropolitan communities than in Seattle, a "relatively young community of more than 800,000 persons."

• Science News Letter, 79:9 January 7, 1961

## PSYCHIATRY

### African Mental Disorders No Different From Others

► THE MAJOR mental disorders occurring in Africa are fundamentally similar to those in other parts of the world.

Schizophrenia, or split personality, seems to be most common, although permanent recovery seems to occur most readily in African patients. Dr. T. Adeoye Lambo, consultant psychiatrist, University College Hospital, Ibadan, Nigeria, reported in the *British Medical Journal*.

One of the most important observations Dr. Lambo made in a five-year study was the comparatively quick recovery of schizophrenics treated within the framework of the community.

However, although schizophrenics were found to constitute nearly two-fifths of the insane criminals in four large asylums in Nigeria, frenzied anxiety is a more common cause of crime.

Tranquilizers have revolutionized the management of psychiatric disorders in Africa, Dr. Lambo said. The boarding of day patients at Aro Hospital in surrounding rural villages for three years could not have been accomplished without drugs that reduced tension, excitement and aggression, he observed.

New problems such as alcoholism, prostitution and character disorders, drug addiction and juvenile delinquency are arising in Africa, he said, but a scientific evaluation of behavior deviations arising from social change has yet to be made.

"The interplay between man and his physical and social environment," he concluded, "would seem to influence considerably the evolution of the disorder—that is, its property of remaining latent or manifest, its later course and its final outcome."

• Science News Letter, 79:9 January 7, 1961

## GENETICS

### Nobelists Give Candy To Demonstrate Genetics

► NOBELIST Dr. George W. Beadle of California Institute of Technology gives away free candy at his public lectures. He also has rabbits and cats as props to illustrate certain points about genetics.

The candy is used in demonstrating the genetically controlled difference between "tasters" and "non-tasters."

Identical twins, developed from the same fertilized egg and, therefore, having the same genetic makeup, are asked to chew a piece of paper treated with phenylthiocarbamide. PTC is bitter for tasters and tasteless for non-tasters but does not test a person's ability to taste other substances. Identical twins react to PTC in the same way. Of fraternal twins, however, one, both or neither may taste the chemical.

The candy is given to cover up the bitter flavor.

The Himalayan rabbits and Siamese cats show how the same gene can produce different effects depending on environment. These rabbits and cats have a pigment that is one color at body temperature but becomes darker at lower temperatures. This is the reason newborn Siamese kittens are more or less solid color and develop the black ears and paws only when these body areas cool off.

Dr. Beadle said that it is easier to discuss details of scientific subjects with younger people than with adults.

"The younger people are more curious and read much more than my generation did. They are less inhibited about thinking of new ideas; they are not saddled with the preconception that science is difficult," Dr. Beadle said at the ninth annual Christmas lectures of the Philosophical Society of Washington, D. C.

• Science News Letter, 79:9 January 7, 1961

## PHARMACOLOGY

### New Drugs Open Air Passages, Heart Vessels

► A NEW SERIES of chemicals that dilate the air passages of the lungs and the blood vessels of the heart has been developed.

The chemicals, some of which probably will be developed as prescription drugs, are the 1,3-dialkyl-6-thioxanthines. They differ from a well-known dilator drug, theophylline, in that a sulfur atom has been substituted for an oxygen atom in the chemical structure.

Some of the new 6-thioxanthines are 60 times as active as the corresponding salts of the older drug, theophylline, in test-tube tests. In the living animals, the effectiveness of the chemicals is reduced, but they are still potent enough to protect guinea pigs from the deadly effects of an aerosol spray that narrows the air passages.

The research is reported in *Nature*, 188:1107, 1960, by Drs. A. K. Armitage and K. R. H. Wooldridge of May and Baker, Ltd., Dagenham, Essex, England.

• Science News Letter, 79:9 January 7, 1961

## ASTRONAUTICS

# Animals Pioneer in Space

Animals are making important contributions to the national effort directed at manned space flight. Mice and monkeys have blazed a trail in space, Lillian Levy reports.

► MORE THAN 15,000 ANIMALS a year are aiding space medical research in the United States for manned space flight.

The space research animals include rats, rabbits, cats, chimpanzees, mice and monkeys. Each of these species already has made important contributions toward knowledge necessary to assure man's survival in the hazardous and hostile environs of space.

Special mice and monkeys actually have ventured into space and lived to squeak and chatter about it while U.S. space scientists observed them. A chimpanzee is scheduled to join soon the furry pioneers who have penetrated the space frontier.

Most of the animals that qualify as candidates for space flight are "undergraduates" at two institutions of higher learning: the University of Texas and the University of Kentucky.

In the laboratories of these schools, hundreds of potential animal astronauts are bred; but only a few are chosen for the specialized "graduate" training at Holloman Air Force Base, New Mexico, and the School of Aviation Medicine, Brooks Air Force Base, San Antonio, Texas.

## Chimpanzee Astronauts Train

Four chimpanzees, the first space candidates of their kind, now are at training quarters at Holloman's aeromedical bi-astronautics branch. Minnie, Tiger, Elvis and Ham, only youngsters not quite three, are part of the National Aeronautics and Space Administration's Project Mercury; and their program of training is much like that of the seven adult human astronauts for whom they will trailblaze in space.

The chimpanzees' training program, worked out by Lt. Col. Rufus R. Hessberg, chief of Holloman's aeromedical field laboratory, is based on the many resemblances of man and chimpanzee, "metabolically, physically and temperamentally."

The "little men" and their "little woman" companion, all Pan troglodytes, or chimpanzees, are rated "ideal subjects for space" by Col. Hessberg and his co-workers who began working with them early in 1958.

Lt. William Ward, an Air Force biologist, was assigned to the "chimp in space" effort to find out how the primates would react to such space conditions as restraint, isolation, weightlessness, physical and mental response, and—finally—actual flight.

"In our first experiments," Lt. Ward said, "all the chimps were excited and a bit upset by the idea of restraint as well as isolation."

Training reports show that they usually quieted down after the first ten or 15 minutes. However, there was one class

failure, Paleface, who was just too excited and unruly.

For the "restraint" tests the simian space cadets are strapped to an especially designed chair of sheet-metal structure, low on the ground, upholstered with insolite, and with a hole in the seat.

The straps are fastened to a snugly fitting nylon vest around the chest and stomach of each animal; and Minnie and her fellow candidates idle in the chair for five to eight hours a day on a five-day week basis. Time off is allowed for any signs of undue stress, and the chimps enjoy periodic vacations from space school.

A reasonable facsimile of an isolation booth is provided by partitions that keep them separated from one another.

Their training also includes management of simple instruments that light a panel in front of each chimp. The animals have learned by means of a "reward" system to push the proper switch to turn the light

off. Their "pay-off" is a tidbit of favored food, bananas.

Training animals for space flight is a job only for men who like them. The Air Force laboratory men who work with them on an "intimate daily basis" have become attached to their simian companions. As Lt. Ward explained, "they behave much as children of the same age, even to the frequency of temper tantrums, and we get attached to them."

Besides dressing them in their "space suits," observing their behavior under test conditions, even "soothing them out of temper tantrums," the men working with the chimps frequently fly with their charges in four-hour test runs.

All the chimps are rated champs in the air. They are good fliers with good responses, Lt. Ward said. He predicted they will do equally well in space flight when they will have to go it alone.

A similar but more advanced graduate program in animal space flight and research is being conducted with monkey, mice, cats, rats and rabbits at the School of Aviation Medicine.

The monkeys used are Texas-born rhesus primates from the University of



**SPACE MONKEY**—Sam Space, Jr., a Texas-born rhesus monkey, is doing "graduate" work in space research. He is trained to pull a lever in response to a flashing light while within a sealed life capsule. The recorded pulls provide a record of the primate's mental and physical alertness during his stay in the sealed capsule.

Texas. The mice are special Air Force C-57 blacks, raised at the space animal institute at the School of Aviation Medicine. Both white rabbits and gray chinchillas also are bred there, while cats and rats are supplied by specialists in research animal breeding. This varied space menagerie is under the tender loving care of Col. Harry Gorman, veterinary surgeon.

Col. Gorman told SCIENCE SERVICE that the cats, rats and rabbits are making equally important if less spectacular contributions than have the space-flying mice and monkeys to our national space effort.

The rats have been used in experiments designed to show the effects of motion, vibration and other forms of stress on the digestive system. The rabbits are relaying information about the effect of radiation exposure from internal dosimeters attached to their spleen and an area above the kidney. Radiation is one of the major hazards of space travel.

Aeromedical experiments with cats may have saved countless lives from fatal concussion, a hazard of jet aviation as well as space flight, Col. Gorman said.

The biopack on Sally, one of the three black mousstronauts that traveled 5,000 miles through space last Oct. 13 in the Air Force Atlas nose cone, was painlessly attached to the skin of the tiny space pioneer who was first anesthetized in a Gorman-designed and built anesthetic chamber for mice. As important as may be the information received from the high-flying mice, Col. Gorman believes monkeys and other primates can contribute more to men in space.

Presently six rhesus monkeys are being prepared for an orbit in a Discoverer satellite scheduled for launch in the very near future.

"All are equal in training and physical qualifications," Col. Gorman said. "And prior to launch, just as in the case of the Mercury astronauts, we will select the one we believe to be best qualified."

The space monkey chosen to go will be aeromed prior to launch anywhere from 12

to 30 hours, just as the Mercury astronaut will be. If for any reason the missile is not ready to go, the selected candidate, whether monkey or man, will have to yield his place to one of his stand-by companions.

Man's place in space is yet to be achieved. So far animals have far surpassed man's exploration of the outer atmosphere. The success they have achieved in withstanding short-range flights in space have prompted researchers to long-range studies and preparation for more extended space flights for animal astronauts.

## Assess Animal Performance

Dr. C. P. Crocetti, a member of the U. S. Air Force's Air Research and Development Command's behavioral sciences advisory panel, has assembled a group of psychologists who are developing a general research program for assessing animal performance in an orbiting vehicle. The program is aimed at answering these questions:

"Can behavior of the simplest types, even well practiced, be maintained by animals in a space environment?"

"Are the major visual and auditory processes affected?"

"Are the protective processes of the organism that must be used in dangerous situations still functional under conditions of prolonged space flight?"

"What effects do repeated flights have on the animal?"

The advanced training activities required to produce the answers to these and other questions will be concentrated at the new comparative psychology branch at Holloman under the leadership of Dr. Frederick Rohles, an Air Force major.

Prolonged training of chimpanzees as well as other animals will be under his leadership. The work is planned to develop special space-oriented feeding devices and parachute-box cages; new techniques for testing monitoring and response capabilities, and experimental vehicle designs and equipment.

• Science News Letter, 79:10 January 7, 1961

## AEROMEDICINE

# Test Against Irradiation

► NONE OF THE MATERIALS tested as protective or therapeutic agents against radiation damage can be endorsed without qualification, two scientists from the Argonne National Laboratory, Lemont, Ill., reported in San Antonio, Tex.

The most successful approach to the problem of recovery in irradiated animals has been the use of bone marrow injections, Dr. John F. Thompson and Dr. Harvey M. Patt have found.

However, a serious deterrent to using transplants is secondary radiation sickness arising several weeks after the animals have recovered from the acute phase of radiation damage. This has been demonstrated primarily in studies with small rodents, as well as dogs, chimpanzees and monkeys. Bone-marrow treatment has been most effective in monkeys.

In the limited use of bone-marrow injections in man, in a few cases of attempted

treatment of leukemia and for five victims of radiation from a reactor accident in Yugoslavia, there was no "clear-cut evidence of a 'take' of the transplanted marrow" in any case, the Argonne scientists found.

The reactor victims showed a dramatic response to the injections of bone marrow, and their recovery from the effects of mixed neutrons and gamma radiation was apparently accelerated. Possibly the most practical solution for post-irradiation treatment of man would be the use of "autologous" marrow.

For example, if a man were to venture into space knowing he would be exposed to radiation, some of his bone marrow could be removed and stored until after exposure and then reinjected into him. The procedure works well in dogs, the scientists said, and might be of value for man.

• Science News Letter, 79:11 January 7, 1961

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# Books of the Week

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**ACTIVATION ANALYSIS HANDBOOK**—R. C. Koch—*Academic*, 219 p., \$8. Describes theory of activation analysis, irradiation facilities and preparation of samples, followed by tabulation of data for each element.

**ALL ABOUT UNDERSEA EXPLORATION**—Ruth Bridger—*Random House*, 145 p., illus., \$1.95. Describes for boys and girls the scientific research of sea-going oceanographers.

**A BIOGRAPHY OF THE SEA: The Story of the World Ocean, Its Animals and Plant Population, and Its Influence on Human History**—Richard Carrington—*Basic Bks.*, 286 p., photographs, \$5. For the general reader.

**BIOLOGY: A Basic Science**—Elwood D. Heiss and Richard H. Lape—*Van Nostrand*, 2nd ed., 689 p., illus., \$5.56. Secondary school textbook stressing experimentation.

**COMPARATIVE BIOCHEMISTRY OF PHOTOREACTIVE SYSTEMS**—Mary Belle Allen, Ed.—*Academic*, 437 p., illus., \$12. Papers presented at the symposium on Comparative Biology of the Kaiser Foundation Research Institute.

**ECOLOGY OF INLAND WATERS AND ESTUARIES**—George K. Reid—*Reinhold*, 375 p., illus., \$7.80. Introduction to the elemental processes that operate in lakes, streams and estuaries as dynamic systems.

**EINSTEIN ON PEACE**—Otto Nathan and Heinz Norden, Eds., preface by Bertrand Russell—*Simon & Schuster*, 704 p., \$8.50. A historical

view of the peace movement in modern times, recorded in the correspondence between Einstein and many famous men of his generation.

**THE ENCYCLOPEDIA OF SPECTROSCOPY**—George L. Clark, Ed.—*Reinhold*, 787 p., \$25. Authoritative reference to the entire field of spectroscopy, from Absorption spectrophotometry through X-ray emission spectrometry, by more than 160 internationally recognized contributors.

**ETHNOGRAPHIC BIBLIOGRAPHY OF NORTH AMERICA**—George Peter Murdock—*Human Relations Area Files (Taplinger)*, 3rd ed., 395 p., maps, paper, \$6.75. Bibliography on primitive and historical cultures, by tribal groups, from Arctic Coast Eskimos to Zunis.

**THE GENTLE LEGIONS**—Richard Carter—*Doubleday*, 335 p., \$4.50. A journalist's study of the economics, faults and merits of the national voluntary health organizations.

**GOALS FOR AMERICANS: Programs for Action in the Sixties**—President's Commission on National Goals, Henry M. Wriston, Chmn.—*Prentice-Hall*, 372 p., \$3.50; paper \$1. Report includes chapters on technological change, education, and the arts and sciences.

**THE GOLDEN AGE OF AMERICAN ANTHROPOLOGY**—Margaret Mead and Ruth L. Bunzel, Eds.—*Braziller*, 630 p., illus., \$10. Covers the period when the young science could still draw on the living memories of American Indians and could use still current practices to illustrate the records of early travelers.

**GRAPHIC SURVEY OF BIOLOGY**—A. M. Weinstein and Benjamin de Leon—*Oxford Bk.*, rev. ed., 459 p., illus., \$2.10; paper, \$1.25. Biology course for secondary schools.

**GRAPHIC SURVEY OF PHYSICS WITH COLLEGE ENTRANCE SUPPLEMENT**—Alexander Taffel—*Oxford Bk.*, rev. ed., 414 p., illus., \$2.10; paper, \$1.25. Textbook for high school level.

**A HISTORY OF ANCIENT GEOGRAPHY: Among the Greeks and Romans from the Earliest Ages till the Fall of the Roman Empire**, Vols. I and II—E. H. Bunbury, new introd. by W. H. Stahl—*Dover*, 2nd ed., 666 p., 743 p., maps, set of 2 vols., \$12.50. Reprint of 1883 edition.

**HORMONES IN HUMAN PLASMA: Nature and Transport**—Harry N. Antoniadis, Ed., foreword by George W. Thorn—*Little*, 667 p., illus., \$25.

Comprehensive and authoritative account of the nature of the transported hormone and in carrier system.

**THE HUMAN USE OF THE EARTH**—Philip I. Wagner—*Free Press*, illus., 270 p., \$6. Shows man as the inhabitant and beneficiary of artificial environments, suggests how different human cultures are modified by the interaction of topography, climate, social and technical development.

**INTRODUCTION TO SEMIMICRO QUALITATIVE ANALYSIS**—C. H. Sorum—*Prentice-Hall*, 3d ed., 239 p., \$3.50. Main changes in this edition are in the details of procedures.

**LABORATORY GUIDE FOR HIGH SCHOOL BIOLOGY**—Brother Joseph A. Kuntz and Brother Edward J. Dury—*Holt, Rinehart & Winston*, 214 p., illus., paper, teacher's ed. \$3.20; student ed. \$1.80. For use with any textbook.

**THE NATIONAL WATERCRAFT COLLECTION**—Howard I. Chapelle—*U.S. National Museum (GPO)*, 327 p., illus., \$3.50. Description of Smithsonian collection of ship models, first established in 1884 and expanded by later models used in American exhibits at international expositions.

**NINETY SECONDS TO SPACE: The X-15 Story**—Jules Bergman—*Hanover House (Doubleday)*, 224 p., photographs, \$4.50. The story of experimental rocket-aircraft designed to take man into space.

**THE PHYSICS OF SOUND**—Russell B. Hastings—*Bruce Pub.*, 259 p., illus., \$7.50. A textbook primarily for music majors, designed to awaken their curiosity about the principles involved, with 40 experiments.

**PRACTICAL PROGRAMS FOR THE GIFTED**—Jack Kough—*Science Research Associates*, 192 p., \$3.50. Written for educators as a reference to the various steps in establishing and administering a school program for gifted students. Many case studies included.

**READING AND THE PSYCHOLOGY OF PERCEPTION**—Hunter Diack—*Philosophical Lib.*, 178 p., \$6. Critical survey of Gestalt theory, brief history of reading theory and author's own observations of how children see words.

**THE RECORDING EYE: A Hundred Years of Great Events as Seen by the Camera, 1839-1939**—Helmut and Alison Gernsheim—*Putnam*, 254 p., 260 photographs, \$7.95. Shows many firsts in photography, railroading, aviation, exploration and discoveries, with commentaries.

**RECORDS OF THE AMERICAN-AUSTRALIAN SCIENTIFIC EXPEDITION TO ARNHEM LAND**, Vol. 2: Anthropology and Nutrition—Charles P. Mountford, Ed.—*Melbourne Univ. Press (Cambridge Univ. Press)*, 515 p., illus., \$19.50. Deals with the health and related aspects of the Australian aborigines, as well as their art and material culture.

**REPAIRING TRANSISTOR RADIOS**—S. Libes-Rider, J. F., 159 p., illus., paper, \$3.50. A text and reference guide to particular problems.

**RUSSIA**—Charles W. Thayer and Editors of Life—*Time Inc. (Life Bks. Dept.)*, 152 p., photographs, map, \$2.95 on open end subscription basis (6 vols. a year). First in Life World Library Series, designed to show how people live in different parts of the world.

**SCIENCE PROJECTS HANDBOOK**—Shirley Moore, Ed., Science Clubs of America—*Science Service*, 253 p., illus., paper, 55¢. A stimulating guide for teen-age boys and girls, full of hints and ideas culled from thousands of projects that have won recognition in science fairs and the National Science Talent Search.

**SOLID GEOMETRY: A Brief Elementary Course for College Students**—J. L. Simpson—*Harpur*, 97 p., illus., \$2.75. Only prerequisites assumed are knowledge of plane geometry and a little elementary algebra.

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STERIC ASPECTS OF THE CHEMISTRY AND BIOCHEMISTRY OF NATURAL PRODUCTS—J. K. Grant and W. Klyne, Eds.—*Cambridge Univ. Press*, 137 p., illus., \$5.50. Symposium dealing with the stereochemistry of substances of plant and animal origin.

THE STORY OF STEREO—John Sunier—*Gernsback*, 160 p., illus., \$5; paper \$2.95. Developments in stereophonic sound on film, on tape and on discs.

THE STORY OF THE ATOM—Mae and Ira Freeman—*Random House*, 80 p., illus. by Rene Martin, \$1.95. In simplest terms tells children what atoms are and how scientists put them to work.

STYLE MANUAL FOR BIOLOGICAL JOURNALS—Committee on Form and Style of the Conference of Biological Editors—*AIBS*, 92 p., \$3. Designed for research workers and students preparing manuscripts for publication in biological journals.

THE TALE OF A POND—Henry B. Kane—*Knopf*, 120 p., illus. by author, \$3. Freshwater biology to be enjoyed by boys and girls.

THEORETICAL AND PRACTICAL PROBLEMS OF MEDICINE AND BIOLOGY IN EXPERIMENTS ON MONKEYS—I. A. Utkin, Ed., transl. from Russian by Ruth Schachter—*Pergamon*, 276 p., illus., \$9. Based on experimentation done at the USSR Institute of Experimental Pathology and Therapy.

THE THEORY AND DESIGN OF INDUCTANCE COILS—V. G. Welsby, foreword by Sir Gordon Radley—*Wiley*, 2nd ed., 232 p., illus., \$6. Of importance to telecommunication engineers.

TOXIC PHOSPHORUS ESTERS: Chemistry, Metabolism, and Biological Effects—Richard D. O'Brien—*Academic*, 434 p., \$14.50. Sourcebook on organophosphate research and evaluation of the effects of poisoning in animals and plants.

• Science News Letter, 79:12 January 7, 1961

## Questions

AGRICULTURE—What is the advantage of a new method for drying grains by solar-heated systems? p. 5.

MINERALOGY—What is molybdenum particularly used for? p. 3-4.

ROCKETS AND MISSILES—Why do third stage rockets need larger skirts? p. 7.

Photographs: Cover, Permal, Inc.; p. 3, F. C. Livingstone; p. 5, James Fitzpatrick; pp. 7 and 10, U. S. Air Force; p. 16, W. R. Grace & Co.

## Do You Know

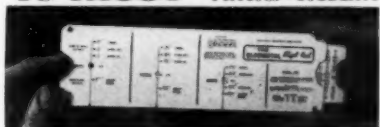
Heart disease causes a little more than half of all the deaths in the U. S.

A pearl oyster found in Tokyo, Japan, measuring a little more than four inches square, contained 620 pearls.

About four-fifths of the fresh vegetable exports of the United States, more than half of the potatoes and a third of the processed vegetables go to Canada.

• Science News Letter, 79:13 January 7, 1961

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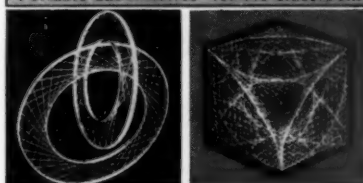
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## ENTOMOLOGY

### African Ticks Tricky Entomologists Discover

► **VISITORS TO UGANDA** or to West African forests have been asked to be on the lookout for an elusive white tick that may hide in their own noses.

Three experienced entomologists were unaware of the nasal invasion until they discovered a tenderness in their noses when they were touched or blown. The infestation occurred during the immature nymph stage of a tick belonging to the genus *Amblyomma*. Dr. V. G. L. Van Someren of Nairobi reported the discovery to Prof. G. A. Walton of University College, Cork, Ireland, who is issuing a call for cooperation in *Nature*, 188:1131, 1960.

Prof. Walton reports that the absence of reaction to the presence of the parasite in man might suggest that nymphs of these ticks normally infest the nasal passages of anthropoid apes, common in Uganda forests.

Assistance in identifying the ticks can be provided by persons who will examine the nasal passages of Uganda mammals, looking for any white ticks falling from the nose of captured chimpanzees.

Persons who become aware of tenderness in their own noses are asked to allow the ticks to remain until they are approximately the size of a small pea. Then they may be blown out or gently removed with forceps.

• *Science News Letter*, 79:14 January 7, 1961

## MEDICINE

### Mental Deficiency Produced in Monkeys

► **PHENYLKETONURIA**, a metabolic defect that causes mental deficiency in human infants, has been reproduced in baby monkeys. Hopefully, this achievement will provide a test animal through which researchers can develop a more satisfactory treatment for human cases.

One or two persons in every 50,000 are born with this metabolic disorder. It is caused by a missing liver enzyme, without which the individual cannot metabolize phenylalanine, an amino acid found in protein. If the disorder is undetected and the child is not put on a special diet before he begins eating protein, brain damage results.

Phenylketonuria was produced in adolescent monkeys in 1959, but in monkeys, as in humans, the brain is more sensitive to abnormal chemical influence in the infant stages.

To induce the defect in the baby monkeys, researchers at the University of Wisconsin, Madison, fed them milk mixed with excessive amounts of phenylalanine from the second day after birth.

Psychological and performance tests begun when the monkeys were one week old showed that they were mentally retarded.

"These monkeys demonstrated motivational defects, inappropriate behavior, subnormal learning and sub-optimal intellectual performance," the scientists reported in *Nature*, 188:1124, 1960.

Neurological examination, however, revealed no sensory or motor abnormalities

in these animals up to one year of age, although two of them had infrequent convulsions.

The researchers, Drs. Harry A. Waisman, Hwa L. Wang, Gail Palmer and Harry P. Harlow, all of the University of Wisconsin, hope to pinpoint biochemical changes in the brain that may be the cause of damage and to produce other types of retardation in monkeys.

• *Science News Letter*, 79:14 January 7, 1961

## MEDICINE

### Remove 258 Objects From Man's Stomach

► **THREE SETS** of rosary beads, 26 keys and a beer-can opener were among the 258 objects removed from the stomach of a mental patient, it is reported in the *Journal of the American Medical Association*, 174:2073, 1960.

Other highlights of your doctor's weekly reading are:

In spite of progress with anesthesia, numerous deaths are still attributed to its faulty use. A study of 1,024 postoperative deaths reported by the Baltimore, Md. anesthesia study committee showed 19.2% of them related to anesthesia. The mortality risk associated with anesthesia has been estimated at four per 10,000 operations. The lowest risk for both sexes in the age group of 15 to 24 years, with the risk for males 7.1% as against 2.7% for females (p. 2015).

Kidney stones are gradually disappearing in children because of increasing attention being paid to nutrition. Dr. Hans H. Zinsser of Columbia University College of Physicians and Surgeons, New York, reported. He said that if as much attention were paid to the diet of adults as for children, great strides could be made in preventing kidney stones. Dr. Zinsser blamed the calcium in milk and antacid preparations as partly responsible for kidney stones among those who have a tendency toward forming them (p. 2062).

• *Science News Letter*, 79:14 January 7, 1961

## MEDICINE

### TV Westerns Produce "Fast Draw" Syndrome

► **PHYSICIANS** of the country can read an editorial in their official magazine, *Journal of the American Medical Association*, 174:1970, 1960, blaming television westerns for the "fast draw" syndrome.

The *Journal* said it is "a pity" that advertisers who profit from showing gangster and horror scenes on television do not show the disfigurement, the hopeless disorganization of joints, the helpless invalidism, the limping and blinding that so often follow.

Another editorial (p. 1968) points out that additional work is needed before measles vaccine can be used as a routine measure, but that a safe and effective preventive for this disease seems near. The public must be educated to a "realization of the great hazards of measles and to acceptance of the vaccine" before its ultimate benefits can be realized, however.

• *Science News Letter*, 79:14 January 7, 1961

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Deplete an animal of vitamin E and creatine shows up in urine. Creatine is  $\text{NH}_2\text{-C(NHCH}_3\text{)-N-CH}_2\text{-COOH}$ . Normally creatine is used by combining with adenosine triphosphate to make phosphocreatine. After phosphocreatine yields up its energy, creatinine is left. Creatinine is anhydride of creatine. Vitamin E somehow mixed up in this. Creatine-to-creatinine ratio in urine is therefore good index of vitamin E status. OK.

Alacreatine is  $\text{NH}_2\text{-C(NHCH}_3\text{)-N-CH}_2\text{-COH}$ . Note that difference  $\text{NHCH}_3\text{O}$  from creatine is position of methyl group. Feed alacreatine to rats and what happens in 6 weeks? They become very weak, as in nutritional muscular dystrophy from lack of vitamin E (*Nature*, 187, 421). (Different etiology from human muscular dystrophy.)

Does alacreatine take place of genuine creatine in combining with ATP? Good question. Good answer could come from someone who buys our alacreatine for further studies. Might beat us in learning new fact about behavior of vitamin E. Would be consolation to know he at least used our alacreatine.

We make alacreatine by reacting thiourea with ethyl bromide to yield ethyl isothiurea hydrobromide, then add this with alkali to alanine. Product splits out with ethyl mercaptan. Ethyl mercaptan stench pretty well worn out as subject for levity.

Nature makes creatine by two-step method also. In kidney an amidine group from arginine transfers to glycine to make glycoylamine. In liver the glycoylamine takes on methyl group from methionine, becomes creatine. It's all done with enzymes. Nature neater, cheaper, makes more useful product.

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## Is knowledge power?

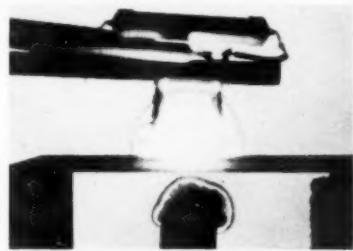
For a year now, reports have been coming in from molders that *Tenite Polypropylene*, viscosity for viscosity, molds better than other polypropylenes. We are pleased about this, of course, but also embarrassed not to know why.

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## Favor for the high-speed congress



Dust Performs for Plant's Pollution-Control Movies, *Chem. Week*, 84:84, 86, May 2, 1959. (Procter & Gamble uses high-speed motion-picture sequences for the qualitative control of in-plant dust.)



The Ignition of Explosives by Radiation, J. Eggert, *J. Phys. Chem.*, 63:11-15, Jan., 1959; also in *Photochemistry in the Liquid and Solid States*, edited by F. Daniels, J. Wiley, N. Y., 1960, pp. 147-53. (High-speed photography proves that the detonation of nitrogen iodide starts before the light flash ends, showing that only a fraction of the energy is used for the detonation.)  
Lath Check Formation in Douglas-fir Veneer, *Forest Products J.*, 10:139-40, March, 1960. (High-speed motion pictures were used to analyze production variables.)

Time after time we have visited a customer proud of some accomplishment with high-speed movies. He is willing to show us—eager, delighted to show us. The projector is started and we watch. We see a collection of strange objects. We don't know for sure what they are. Little seems to be happening. After quite a while, a new object enters the scene from the left. Shortly another new object comes up from the bottom. The two dance around each other, touch, and exit from the top of the frame. All is again static on the screen. After another while the reel comes to its end and we

jump to our feet exclaiming hearty congratulations.

He deserves congratulations, probably. If we had lived with the problem as he has, the objects in the picture might have seemed no stranger than the face in the bathroom mirror; the dance might have been the triumphant, forceful, sudden, undisputed clincher to a vexatious problem; the all-purpose enthusiasm of the born salesman might have meant more.

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Another thing. A bibliography on high-speed photography. Every item our library knows. Forty-six pages of items like the specimens at the immediate left. No pictures, though. No charge either. Coverage extends into 1960. Got it ready to distribute to the Fifth International Congress on High-Speed Photography in Washington in October. Doomed to a short life, since the Congress promptly generated so many new papers on high-speed photography that the abstracts alone run from p. 609 to p. 682 of the September, 1960, issue of the *Journal of the Society of Motion Picture and Television Engineers*.

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• Science News Letter, 79:16 January 7, 1961

❁ **RECHARGEABLE FLASHLIGHT BATTERY** gives 50% more continuous light than a standard flashlight battery and fits all two-cell "D" flashlights. Removable cap permits recharging in any AC 110 volt outlet. The nickel cadmium battery can be recharged to full strength overnight.

• Science News Letter, 79:16 January 7, 1961

❁ **TESTER AND SPOTLIGHT** comes in convenient carrying case for checking wiring, controls, fuses, circuits, grounds, shorts, switches and fills many other purposes. Case fits onto belt so that both hands are free. Tools are available without carrying case, which may be purchased separately.

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❁ **TUMBLER BALANCING GAME** any number of persons can play, is based on the Dr. Seuss "Yertle the Turtle" story. One object of the game, shown in the photograph, is to get all 21 high density poly-



ethylene Yertles balanced on a tumbler. Game directions allow different rules and point systems according to group playing.

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❁ **STEREO HEADSET** for personalized high-fidelity listening connects to any stereo hi-fi amplifier. The user can experience full range and volume of hi-fi

tapes and recordings without disturbing others. Chairside control unit is optional accessory.

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❁ **STAINLESS STEEL THRESHOLD** is pre-notched for speedy installation and does not require cutting for door jamb or stop. Vinyl seal has double dust caps and no open joints for dirt or moisture accumulation. Comes complete with screws and instructions.

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❁ **HOUSEHOLD SPONGE CLOTH** reinforced with a web of strong fibers to prevent tearing, is highly absorbent and lint-free. The 7½-by-10-inch cellulose sponge cloth is bulky enough to provide absorbency but is pliable and easy to handle.

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❁ **FLEXIBLE MAGNETIC TAPE** has finely divided magnetized particles uniformly distributed. One side only is strongly magnetic, the non-magnetic side can be molded, hot-stamped or printed. The magnetic tape has varied consumer and industrial uses such as weather-stripping material, a seal for refrigerator doors and to stop auto hood and door rattles.

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## Nature Ramblings



► **THE NAME** "snowbird" has been applied rather indiscriminately to a large number of small winter birds of gray or brown, sparrow-like plumage.

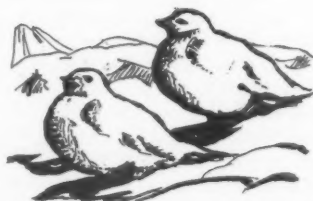
Junco, nuthatch, titmouse, chickadee and several of the native sparrows may be seen flying about or clinging to weed stalks that stick up through the snow. They do not seem to mind the winter weather and they stay with us from the time of red leaves until the first flowers appear.

The clue to the birds' presence is the weed stalks. Without these natural gardens in ditches and field corners, the birds could not survive the winter. Most of them are vegetarians, and consume vast quantities of weed seeds.

Some, to be sure, are meat hunters, and the astonishing acrobatics of the nuthatch and the chickadee are performed as part of their inchwise search over bark and twigs for eggs and pupae of insects.

Perhaps the greatest winter lover among the birds is the snow bunting. This cheer-

### Snowbirds



ful little fellow lives his entire life in snowy regions.

In summer, the snow buntings nest on the islands up at the top of the globe in Canada where the sun shines all night long. When winter comes, they migrate southward, away from the perpetual night of the Arctic.

But they come only as far south as the northern part of the United States, where

it is still cold and snowy, but where there is some sunshine. It is a rare straggler that reaches the frost-free land of Dixie.

When we see the buntings they are in winter plumage. The back, wings and tail are red-brown, streaked with black, but the underparts and head are white, washed with rust. Flocks of buntings flit over the snow to feed on the seeds of ragweed, pigweed, foxtail grass, beach grass, sedges, bulrush, bindweed and mustard.

These birds have been seen foraging comfortably at temperatures down to 35 degrees below zero Fahrenheit. That they are voracious eaters is attested by the fact that 1,500 pigweed seeds have been found in the stomachs of some.

Self-sufficient though they may be, all the snowbirds appreciate a human handout—a few crumbs, a piece of suet and a pan of heated water. They also like to enjoy their meal in peace! Remember to bell the cat.

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